

SUPPLY CHAIN MANAGEMENT: PUTTING THE END CUSTOMER FIRST

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ABSTRACT

This paper explores aspects of alignment in the supply chain by extending the boundaries of operations management theory into the supply chain. Instead of a focus on manufacturing processes in isolation, the paper proposes that a broader, supply-chain view of alignment with product characteristics in the market place needs to be undertaken. Our views are illustrated by a case study that investigated the European 3PL operation involving the supply, sortation and despatch of parts and subassemblies for a manufacturer we have called ElecCo. Flexible capabilities had been developed – unnecessarily in our view – in order to cope with the high variability of demand placed on the supply chain by ElecCo's desire to provide the stock market with higher priority than the end customer.

INTRODUCTION

Materials and finished product only flow through the supply chain because of consumer behaviour at the end of the chain (Gattorna, 1998). In other words, supply chain processes should be co-ordinated in order to focus on end customer buying behaviour. Such thinking has led us to define *customer responsiveness* as planning and controlling the flow of materials through a sequence of supply chain processes in order to meet end customer buying behaviour. Particular challenges emerge when product life cycles are shortening, variety is ever increasing and – in consequence – demand is becoming more difficult to forecast. In such circumstances, Goldman et al (1995) propose that an organisation needs to be 'capable of operating profitably in a customer environment of continually, and unpredictably, changing customer opportunities'.

In an earlier study of an FMCG supply chain, we found that functional decisions made at source-make-deliver processes were not linked together, and that decision making at each major process is driven by different criteria. We have referred to this phenomenon as 'matrix twist' (Godsell and Harrison, 1992) to point out the lack of alignment between processes that results. Each major supply chain decision was founded on different criteria, as shown in Figure 1:

Supply Chain Process	Supply Chain Decision	Determined By
Source	Which suppliers?	Raw material commodity type
Make	Which manufacturing site?	Product family type
Deliver	Which manufacturer warehouse?	Historically a function of order size In process of being divided by export paperwork requirements and customer account (arbitrary split)
	Which customer Regional Distribution Centre?	Product type and Location of store to serve
	Which products to which store?	Demographics of the store's catchments area which drives layout and range decisions

Figure 1: Supply Chain Sub-Optimisation

Such considerations call into question the whole premise of supply chain management. Can a supply chain truly be considered to be *managed* when it is an eclectic mix of functional strategies? Our research has found that in the absence of a designated supply chain integrator – such as logistics service providers who plan and co-ordinate material movements - there is little evidence of supply chains being formally managed. Functional organisational structures promote lack of alignment within individual companies and across the supply chain.

A starting point for such process alignment is end customer needs. By placing the end customer first, market needs can be understood, and a supply chain strategy crafted to help partners work together to meet these needs. But such a customer focus is often lacking in practice. This is somewhat surprising, as companies increasingly cite ‘customer responsiveness’ as a key corporate objective. Based on our research, the key is to take an understanding of the market and associated customer buying behaviours, and use this to drive supply chain strategy. In turn, internal and external capabilities need to be aligned with this strategy. Adopting such a customer-focused approach to SCM suggests that customer responsiveness is about *the identification and delivery of an appropriate supply chain strategy to meet the needs of the market that it serves*. This is driven not by products, channels or markets but by market segments and is achieved by *matching* the desired strategy with the capabilities of the supply chain to deliver.

PRODUCT/PROCESS CHOICE

Hayes & Wheelwright (1979) proposed a lifecycle view of products and processes based on relative volume and variety considerations. Their model suggests a continuum along which a certain kind of product structure is matched with its natural process choice, ranging from job shop (high variety, low volume) to continuous flow (supporting the opposite product characteristics). From an operations perspective, the objective is therefore one of developing supply chain capabilities that ‘match’ the characteristics of products in the market place. For instance, the production of made to order custom built sports cars has a relatively low volume of production but has the potential for near infinite variety. Recent work by Ahmad and Schroeder (2002) reinforces the view that advantage can also be gained by ‘moving off the product-process diagonal’:

‘...we observed certain groups that deviated from the prescription of the product-process matrix framework. These groups of plants were able to minimise trade-offs by producing products with custom options and customised products without sacrificing efficiency.’

The key is to understand the positioning of product: process combinations and not to allow them to ‘drift’ outside process capability limitations as a product matures. As the product matures and the market fragments an organisation may meet these evolving needs through a number of iterations during the product lifecycle, en route to a strategy of ‘mass customisation’.

Linking Markets and Process Choice

Operations Management theory also contributes the concept of linking marketing and operations. Developing Hill's manufacturing strategy framework (2000) into the supply chain, five stages can be proposed:

1. Identify product range objectives
2. Determine marketing strategy to meet these objectives
3. Identify order winners and qualifiers by segment
4. Establish the process choice at each stage of the supply chain
5. Provide the supporting infrastructure

Such an extension to the wider supply chain is an effective way of overcoming the limitations of a 'manufacturing only' focus, and an approach that academics are increasingly advocating (Doyle 2002, Harrison and Van Hoek 2002). However, such ideas remain largely at the conceptual level, and there is little empirical evidence to support the link between marketing and supply chain strategies. This paper seeks to contribute to this gap.

RESEARCH DESIGN

The objective of this study is to empirically study the contemporary phenomenon of supply chain management in a third party logistic provider (3PL) context. This phenomenon is difficult to define and distinguish from its 3PL context and there is thus a natural fit with a case study approach.

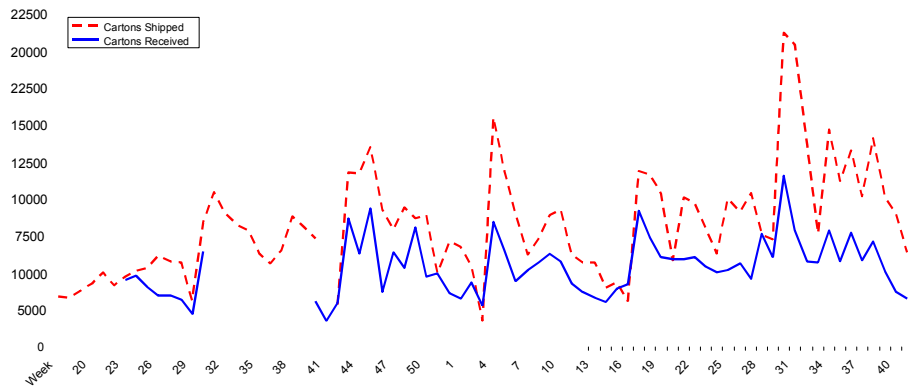
The case study was developed around a focal firm (LogiCo), who are the 3PL to ElecCo (a major player in network technology). In their role as 3PL LogiCo were served by a number of different inbound and outbound carriers and delivered product direct to ElecCo's customer base. Logico's task was to sort, pick and despatch incoming parts and subassemblies according to ElecCo's instructions. It was this sortation system, based on a European distribution centre, that became the focus of our research. Once this focus had been identified, more in-depth fieldwork took place across the supply chain as part of the research content phase, using process mapping and semi-structured interviews as the primary research instruments. Due to the cross-boundary nature of the study, a process-oriented unit of analysis was used based on the Supply Chain Operations Reference (SCOR – see references) model. This model considers the conversion of demand into supply across the supply chain. The organisational span of the project was from LogiCo's Suppliers (source), through LogiCo (make) to ElecCo's customers, TCo and Dco (deliver). The third and final phase of the case study is data analysis. This paper is concerned with the strategy formulation aspects of the strategic alignment model, and mainly addresses customer focused market segmentation and the strategic responses that this invokes from the perspective of the LogicCo-ElecCo relationship.

RESULTS

Figure 2 shows the number of cartons received and shipped over an approximately 18-month period. The number of cartons shipped is normally greater than the number

received because the product was broken down into smaller shipping cartons during the sortation process:

Figure 2: Cartons Received & Shipped (Wk 18 Yr 1- Wk 42 Yr 2)



The demand series demonstrates considerable variability around the mean, as shown in Figures 3.1 (inbound) and 3.2 (outbound):

Figure 3.1: Xbar and R Chart for Inbound

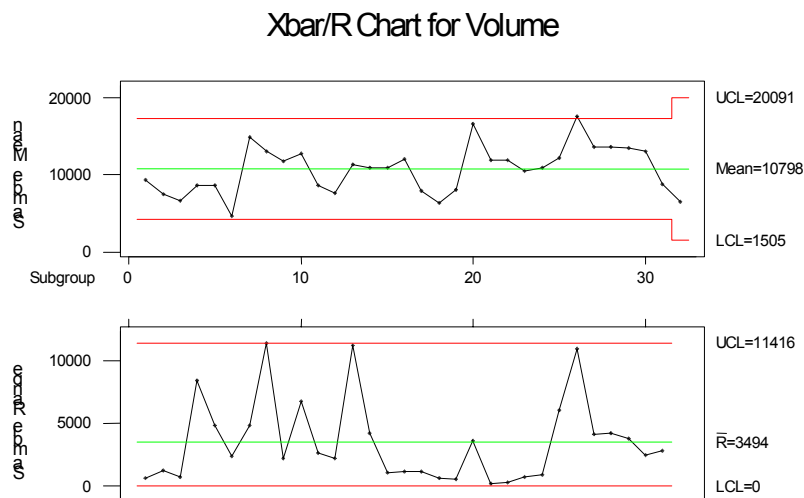
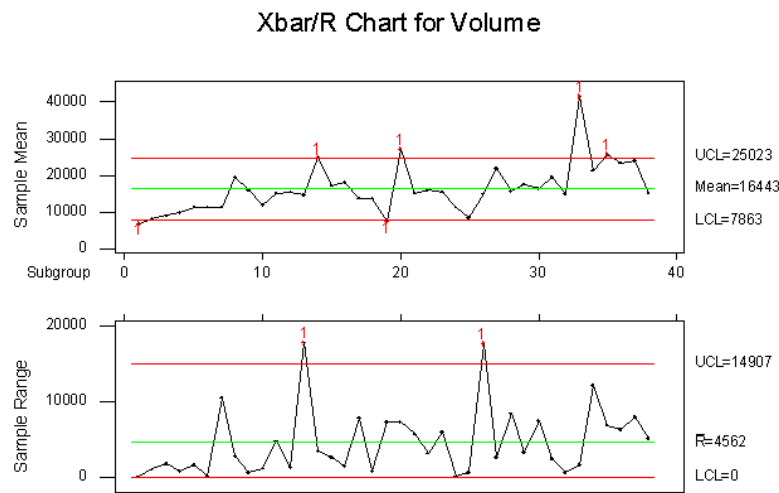


Figure 3.2: Xbar and R Chart for Outbound



Much of the variability was characterised by quarterly peaks in demand followed by falling pressure on the supply chain. This was driven by ElecCo's need to meet the expectations of the financial markets, and created the familiar 'reverse hockey stick' effect. All parties in the supply chain (source make and deliver) felt able to deal with this variability.

However, there were obvious penalties for this flexibility. Since ElecCo provided no meaningful forecast, volumes had to be predicted on the basis of the quarterly 'reverse hockey' stick effect and historical information. It was necessary to respond to demand variability through:

- Excess capacity (particularly in the carrier network)
- Labour flexing (use of temporary staff – particularly for known busy periods)
- Sub-contracting (have preferred sub-contractors which can be used, often 'badged' as contracting carrier)

Customer Responsiveness was measured by comparing delivery performance in response to Tco's and Dco's orders. Here, the supply chain proved not to be so responsive. ElecCo responded to orders by changing to a 'promise date', and measured performance to promise date and not to actual customer request date. Most orders were delivered after the customer request date - average 16 days later for DCo, and 10 days late for TCo.

Each echelon in the supply chain measured their performance against a service level rather than against what the end customers actually wanted:

- Inbound – measure adherence to inbound target

- LogiCo – measure against outbound target
- ElecCo - separate manufacturing and logistics targets through the promise date

Accounts were segmented across the supply chain by value and strategic importance. Service levels - with the exception of strategic accounts – were developed on a number of standardized options, mainly varying on lead time and associated cost. There was thus a lack of strategic alignment, and we concluded that the supply chain was neither customer nor market driven.

CONCLUSIONS

The supply chain was effectively managed by LogiCo, the 3PL in this case. We have found that supply chains which are not managed in such a way by 3PL/4PL's have not had such a clear integration strategy. Effectively, LogiCo were managing the supply chain to ElecCo's requirements, and ElecCo were the effective 'power behind the scene'. However, ElecCo's priorities were the stock market first, and the end customer second. This created much unnecessary variability in the supply chain from a customer responsiveness point of view. While supply chain partners to ElecCo had developed flexible capabilities that could cope with this variability (excess capacity in the carrier network, labour flexing and subcontracting), much of these added needless cost to the supply chain as a whole. Capabilities put in place by ElecCo's partners could be said to be more characteristic of a higher variability-lower volume processes than were merited by the relatively stable 'base load' on the supply chain.

We are continuing to work on the conclusions of these and other studies by developing a supply chain 'road map' that enables organisations in a supply chain to visualise these mismatches and to create a new supply chain strategy to reduce their effect.

REFERENCES

A list of references to accompany this paper can be obtained from a.harrison@cranfield.ac.uk